UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,087	05/30/2001	Navin Kumar Sinha	JP920010012US1	6782

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EXAMINER
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ART UNIT	PAPER NUMBER
2122	

DATE MAILED: 07/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 May 2001*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 January 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *04/03/03*.

4)☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____ .

DETAILED ACTION

1.   Claims 1-20 are pending and have been examined. The priority date considered for the application is May 30, 2001.

Claim Objections

2.   Claims 3, 7, 13 and 17 are objected to because of the following informalities: The claims recite "whether there the cost," which was perhaps intended to be --whether the cost-- instead. Appropriate correction is required.

Claim Rejections - 35 USC § 102

3.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4.   Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Pat. No. 5,797,013 to Mahadevan et al. (hereinafter "Mahadevan").

With respect to claim 1, Mahadevan discloses a method of optimizing the compiled code generated from high level computer programming languages which include loop constructs (see the title and abstract), the method comprising the steps:

(1) providing a loop code segment corresponding with a loop construct written in a high level programming language, in which the loop construct is executed a loop repetition number of times n (see column 6, lines 22-27, which shows providing loop code for a loop written in a

higher level language, and column 7, lines 30-35, which shows that the loop is iteratively

executed some number of times, i.e. n times);

(2) providing execution conditions required to cause execution of the loop construct the

loop repetition number of times n (see column 7, lines 35-39, which shows providing conditions

for executing the loop n times);

(3) optimizing the loop code segment for the execution conditions to provide a

consolidated code segment corresponding with the execution conditions for execution of the loop

said loop repetition number of times n (see column 10, lines 53-61, which shows optimizing the

loop to provide code corresponding to the trip count, i.e. the number of repetitions n);

(4) determining whether the consolidated code segment should be executed in preference

to the corresponding code segments before said optimization (see column 10, lines 46-52, which

shows determining the most favorable optimization prior to optimizing the code); and

(5) if said determination is favorable, including the consolidated code segment in

optimized code for a program written in the high level programming language (see column 10,

lines 53-61, which shows optimizing the code using the most favorable optimization).

With respect to claim 2, Mahadevan discloses a method of optimizing the compiled code

generated from high level computer programming languages which include loop constructs (see

the title and abstract), the method comprising the steps:

(1) providing a loop code segment corresponding with a loop construct written in a high

level programming language, in which the loop construct is executed a loop repetition number of

times n (see column 6, lines 22-27, which shows providing loop code for a loop written in a

higher level language, and column 7, lines 30-35, which shows that the loop is iteratively

executed some number of times, i.e. n times);

(2) providing a pre-loop code segment corresponding with programming instructions

preceding the loop construct, and a post-loop code segment corresponding with instructions

succeeding the loop construct (see FIG. 3, which shows instructions preceding and succeeding

the loop to be provided as pre-loop and post-loop code, respectively);

(3) providing execution conditions required to cause execution of the loop construct the

loop repetition number of times n (see column 7, lines 35-39, which shows providing conditions

for executing the loop n times);

(4) revising the pre-loop, loop and post-loop code segments to include the execution

conditions (see FIG. 3, which shows including the execution conditions with the pre-loop, loop

and post-loop code); and

(5) optimizing the pre-loop, loop and post-loop code segments for the execution

conditions to provide a consolidated code segment corresponding with the execution conditions

for execution of the loop said loop repetition number of times n (see column 10, line 53 to

column 11, line 8, which shows optimizing the loop to provide code corresponding to the trip

count, i.e. the number of repetitions n, and optimizing the placement of compensation code as

pre-loop or post-loop code; see also FIGS. 5 and 6, which show optimized pre-loop, loop and

post-loop code);

(6) determining whether the consolidated code segment should be executed in preference

to the corresponding code segments before said optimization (see column 10, lines 46-52, which

shows determining the most favorable optimization prior to optimizing the code); and

(7) if said determination is favorable, including the consolidated code segment in

optimized code for a program written in the high level programming language (see column 10,

lines 53-61, which shows optimizing the code using the most favorable optimization).

With respect to claims 3 and 7, Mahadevan further discloses the limitation wherein said

determination involves a cost-benefit analysis to determine whether there the cost of using the

consolidated code segment is reduced by a predetermined threshold compared with not using the

consolidated code segment (see column 10, lines 46-52, which shows determining the most

favorable optimization while taking into account the cost of not using the most favorable

optimization, and column 10, lines 7-45, which shows thresholds used in the determination).

With respect to claims 4 and 8, Mahadevan further discloses the limitation wherein the

inclusion of said consolidated code segment in the optimized code is conditional on the

occurrence of the execution conditions (see column 9, lines 46-50, which shows that the

inclusion of the optimized loop in the code is conditional, e.g. on the occurrence of the execution

conditions).

With respect to claims 5 and 9, Mahadevan further discloses the limitation wherein said

loop constructs includes any one or more of the following loop constructs: for loops, while loops,

repeat loops (see column 2, lines 22-24, which shows that the loops may include for loops, while

loops and do loops, i.e. repeat loops).

With respect to claim 6, Mahadevan further discloses the limitation wherein said steps (1)

to (5) are repeated a predetermined number of times k, for values of the loop repetition number n

from 0 to k-1 (see column 7, lines 30-35, which shows that the operations are repeated for each

iteration of the loop, and column 6, lines 22-27, which shows processing all the loops).

With respect to claim 10, Mahadevan further discloses the limitation wherein said steps

(1) to (7) are repeated a predetermined number of times k, for values of the loop repetition

number n from 0 to k-1 (see column 7, lines 30-35, which shows that the operations are repeated

for each iteration of the loop, and column 6, lines 22-27, which shows processing all the loops).

With respect to claim 11, Mahadevan discloses a compiler for optimizing the compiled

code generated from high level computer programming languages which include loop constructs,

the compiler being embodied on a computer-readable medium (see column 11, lines 9-22, which

shows a compiler for optimizing code with loops generated from a higher level language, and

FIG. 1, which shows an associated computer-readable medium). The additional features and

limitations of this claim are analogous to the limitations recited in claim 1 (see the explanation

for claim 1 provided above).

With respect to claim 12, Mahadevan discloses a compiler for optimizing the compiled

code generated from high level computer programming languages which include loop constructs,

the compiler being embodied on a computer-readable medium (see column 11, lines 9-22, which

shows a compiler for optimizing code with loops generated from a higher level language, and

FIG. 1, which shows an associated computer-readable medium). The additional features and

limitations of this claim are analogous to the limitations recited in claim 2 (see the explanation

for claim 2 provided above).

With respect to claims 13 and 17, the limitations of these claims are analogous to the limitations recited in claims 3 and 7 (see the explanation for claims 3 and 7 provided above).

With respect to claims 14 and 18, the limitations of these claims are analogous to the limitations recited in claims 4 and 8 (see the explanation for claims 4 and 8 provided above).

With respect to claims 15 and 19, the limitations of these claims are analogous to the limitations recited in claims 5 and 9 (see the explanation for claims 5 and 9 provided above).

With respect to claim 16, the limitations of this claim are analogous to the limitations recited in claim 6 (see the explanation for claim 6 provided above).

With respect to claim 20, the limitations of this claim are analogous to the limitations recited in claim 10 (see the explanation for claim 10 provided above).

Conclusion

5.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. U.S. Pat. No. 6,539,541 to Geva, U.S. Pat. No. 6,301,706 to Maslennikov et al., U.S. Pat. No. 6,038,398 to Schooler and U.S. Pat. No. 6,026,240 to Subramanian disclose relevant methods for optimizing loops.

6.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Yigdall whose telephone number is (703) 305-0352. The examiner can normally be reached on Monday through Friday from 7:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (703) 305-4552. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MY

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